

We claim:

1. A method of suppressing electroendosmotic flow in capillary electrophoresis, the method comprising providing a separation medium containing one or more  
5 uncharged water-soluble silica-adsorbing polymers having (i) water solubility in a temperature range between about 20°C and about 50°C, (ii) a concentration in the separation medium in a range between about 0.001% and about 10% (weight/volume), (iii) a molecular weight in the range between about  $5 \times 10^3$  and about  $1 \times 10^6$  daltons, and (iv) an absence of charged groups in an aqueous medium having a pH in the range  
10 between about 6 and about 9.

2. The method of claim 1 wherein said one or more uncharged water-soluble silica-adsorbing polymers are substantially non-hydroxylic.

15 3. The method of claim 2 wherein at least one of said one or more uncharged water-soluble silica-adsorbing polymer is a polylactam.

4. The method of claim 3 wherein at least one of said one or more uncharged water-soluble silica-adsorbing polymer is polyvinylpyrrolidone.

20 5. The method of claim 1 wherein at least one of said one or more uncharged water-soluble silica-adsorbing polymer is an N,N-disubstituted polyacrylamide or an N-substituted polyacrylamide, wherein said nitrogen substituents are selected from the group consisting of C<sub>1</sub> to C<sub>3</sub> alkyl; halo-substituted C<sub>1</sub> to C<sub>3</sub> alkyl; methoxy-substituted  
25 C<sub>1</sub> to C<sub>3</sub> alkyl; and hydroxyl-substituted C<sub>1</sub> to C<sub>3</sub> alkyl.

6. The method of claim 5 wherein said nitrogen substituents are selected from the group consisting of C<sub>1</sub> to C<sub>3</sub> alkyl; halo-substituted C<sub>1</sub> to C<sub>3</sub> alkyl; and methoxy-substituted C<sub>1</sub> to C<sub>3</sub> alkyl.

30 7. The method of claim 6 wherein said at least one of said one or more uncharged water-soluble silica-adsorbing polymer is poly(dimethylacrylamide).

8. The method of claim 7 wherein said electroendosmotic flow is less than about  $2 \times 10^{-5}$  cm<sup>2</sup>/sec-volts.  
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9. The method of claim 7 wherein said one or more uncharged water-soluble silica-adsorbing polymers provides a substantially linear relationship between number of theoretical plates and size of polynucleotide in the size range of between about 100 and about 500 nucleotides.

5 10. A method of suppressing wall-analyte interaction in capillary electrophoresis, the method comprising providing a separation medium containing one or more uncharged water-soluble silica-adsorbing polymers having (i) water solubility in a temperature range between about 20°C and about 50°C, (ii) a concentration in the separation  
10 medium in a range between about 0.001% and about 10% (weight/volume), (iii) a molecular weight in the range between about  $5 \times 10^3$  and about  $1 \times 10^6$  daltons, and (iv) an absence of charged groups in an aqueous medium having a pH in the range between about 6 and about 9.

15 11. The method of claim 10 wherein said one or more uncharged water-soluble silica-adsorbing polymers are substantially non-hydroxylic.

12. The method of claim 11 wherein at least one of said one or more uncharged water-soluble silica-adsorbing polymer is a polylactam.

20 13. The method of claim 12 wherein at least one of said one or more uncharged water-soluble silica-adsorbing polymer is polyvinylpyrrolidone.

25 14. The method of claim 10 wherein at least one of said one or more uncharged water-soluble silica-adsorbing polymer is an N,N-disubstituted polyacrylamide or an N-substituted polyacrylamide, wherein said nitrogen substituents are selected from the group consisting of  $C_1$  to  $C_3$  alkyl; halo-substituted  $C_1$  to  $C_3$  alkyl; methoxy-substituted  $C_1$  to  $C_3$  alkyl; and hydroxyl-substituted  $C_1$  to  $C_3$  alkyl.

30 15. The method of claim 14 wherein said nitrogen substituents are selected from the group consisting of  $C_1$  to  $C_3$  alkyl; halo-substituted  $C_1$  to  $C_3$  alkyl; and methoxy-substituted  $C_1$  to  $C_3$  alkyl.

35 16. The method of claim 15 wherein said at least one of said one or more uncharged water-soluble silica-adsorbing polymer is poly(dimethylacrylamide).

17. The method of claim 16 wherein said electroendoosmotic flow is less than about  $2 \times 10^{-5}$  cm<sup>2</sup>/sec-volts.

18. The method of claim 16 wherein said one or more uncharged water-soluble silica-adsorbing polymers provides a substantially linear relationship between number of theoretical plates and size of polynucleotide in the size range of between about 100 and about 500 nucleotides.

19. A composition for separating polynucleotides by capillary electrophoresis, the composition comprising:

a charge-carrying component;

a sieving component; and

a surface interaction component consisting of one or more uncharged water-soluble silica-adsorbing polymers having (i) water solubility in a temperature range between about 20°C and about 50°C, (ii) a concentration in the separation medium in a range between about 0.001% and about 10% (weight/volume), (iii) a molecular weight in the range between about  $5 \times 10^3$  and about  $1 \times 10^6$  daltons, and (iv) an absence of charged groups in an aqueous medium having a pH in the range between about 6 and about 9.

20. The composition of claim 19 having a viscosity less than about 5000 centipoise.

21. A method of separating different-sized polynucleotides by electrophoresis in an uncoated silica capillary, the method comprising the steps of:

providing an uncoated silica capillary having a first end and a second end, the uncoated silica capillary containing one or more uncharged water-soluble silica-adsorbing polymers having (i) water solubility in a temperature range between about 20°C and about 50°C, (ii) a concentration in the separation medium in a range between about 0.001% and about 10% (weight/volume), (iii) a molecular weight in the range between about  $5 \times 10^3$  and about  $1 \times 10^6$  daltons, and (iv) an absence of charged groups in an aqueous medium having a pH in the range between about 6 and about 9;

loading a sample of different-sized polynucleotide in the uncoated silica capillary; and

applying an electrical field between the first and second ends of the uncoated silica capillary so that the different-sized polynucleotides in the sample migrate through the uncoated silica capillary.